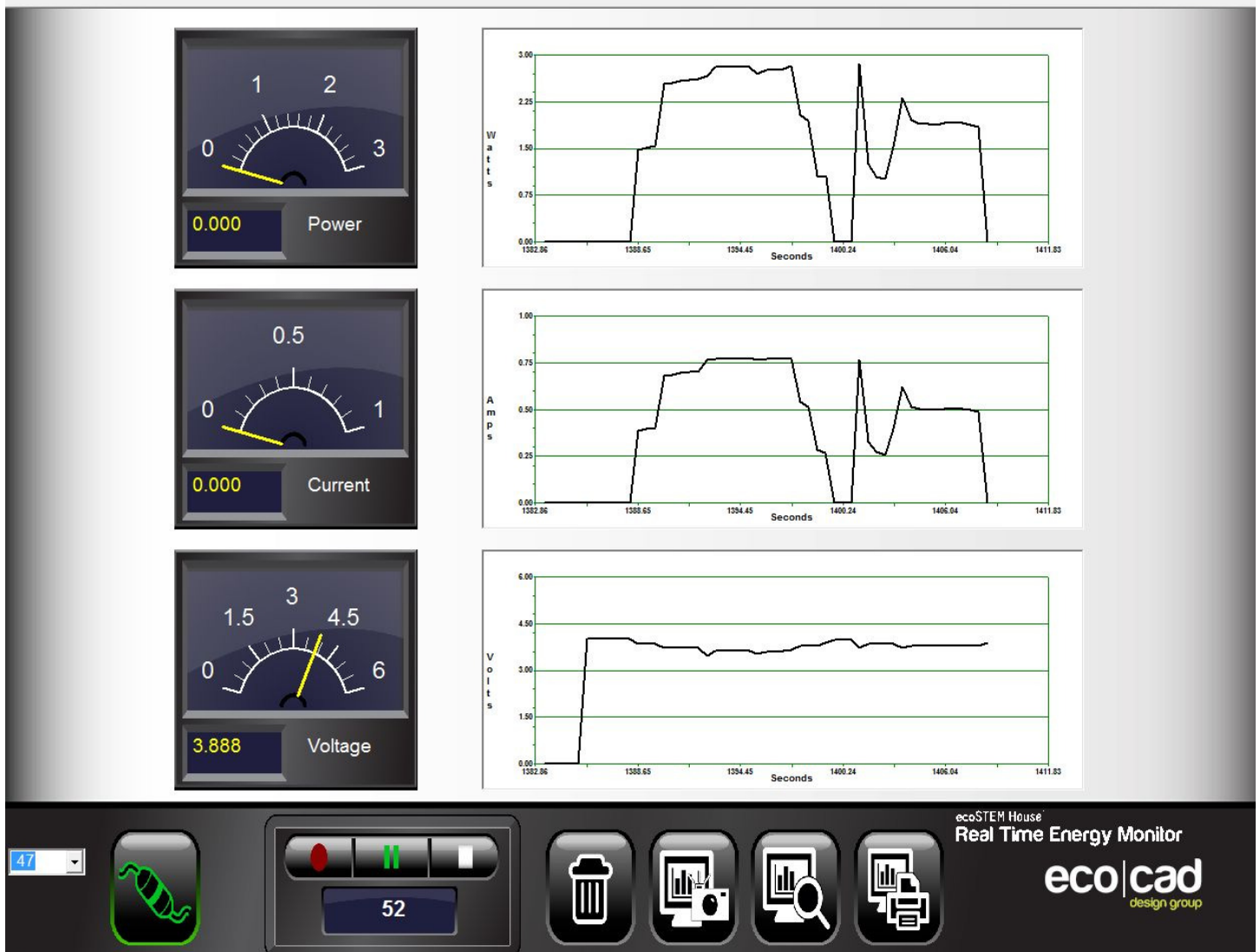


Real Time Energy Monitoring Software User Manual

By ecoCAD Design Group, LLC – www.ecoStemHouse.com



Important Advisories

The software is presented in “as is” condition. By using the software you hold EcoCAD Design Group, LLC and all members, investors, employees and owners harmless from any damages arising from its use including, but not limited to, any tests or experiments done with it.

In no case shall EcoCAD Design Group, LLC be liable for any incidental damages or injuries resulting from the use of the software and any tests or experiments done with it.

The software is not warranted for fitness for any particular purpose.

Users of the software assume all responsibility for its safe and effective use.

Near Real Time Measurements

The electrical data displayed as graphic plots and numbers on the meters are said to be in “real time”; however, bear in mind that the ecoSTEM House Control Panel electronics require a finite time to process the electrical data and then transmit it to the computer for display.

When the data is finally displayed there will be several milliseconds of delay between capture and display.

The software is not an oscilloscope; however, the data are presented in near real time with all data elements like voltage, current and power providing a much better observation of the experimental results as compared with a simple meter.

Not a Video Game

Do not rapidly and repeatedly click on the graphic screen icons. This will cause the software to crash. The graphic program is designed for serious experimental operation. Please use it as such.

Introduction

ecoCAD Real Time Energy Monitoring Software works in conjunction with the **ecoSTEM House™ Control Panel** to measure and record the electrical power generation and loading effects of solar panels, wind turbines, batteries, LEDs, fans, cars and other electrical devices.

Computer Requirements

- Windows XP, Vista or Win 7 operating system.
- USB Port
- CDROM or DVD drive –or – Internet access for download of software code
- MACs must use a suitable emulation software program

Installing the Software

Insert the supplied CDROM disc into your computer and follow the directions to install the software. Or you can download the software and USB driver here:

Software

http://www.selmaware.com/distro/ecoStem_House_v12.exe

Video Tutorial

<http://www.youtube.com/watch?v=M4AS5JigMoA>

A USB Driver must be installed for the software to run.

USB Driver:

<http://www.ftdichip.com/Drivers/VCP.htm>

(notice the exe download on the right)

Running the Software

Always attach the USB cable between the ecoSTEM House™ Control Panel and your computer BEFORE you click on the icon to start the software.

Double-click on the desktop icon to launch the software. A ecoSTEM logo will appear followed by the program.



Connecting

Click the Connect icon at the bottom-right of the screen. It will turn from red to green to show that it is connected to the USB device on the other end.

The number shown to the left of the Connect icon is the Comm Port number that your computer assigns to the device connected to the end of the USB cable.

Nothing will happen unless you click the Connect icon. The number next to it represents the Comm port that your computer has assigned to the software. Refer to the “More Details” section for a further explanation.



Meters

There are three meters. The top meter is Power (in Watts), the center meter is Current (in Amps) and the bottom meter is Voltage (in Volts). The meters will react to the electrical power sources like solar panels, wind turbines and batteries and loads like the ceiling LEDs, fans and SuperCAP car.

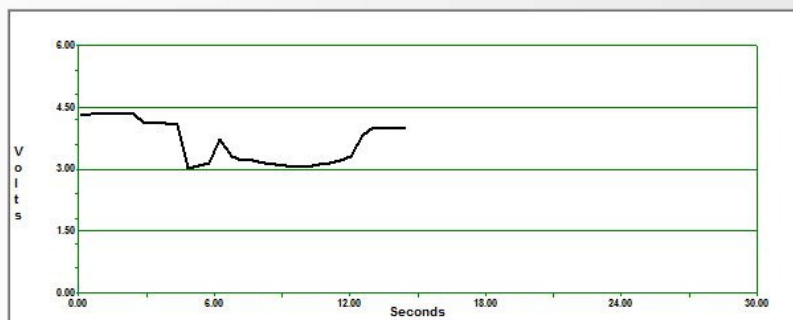
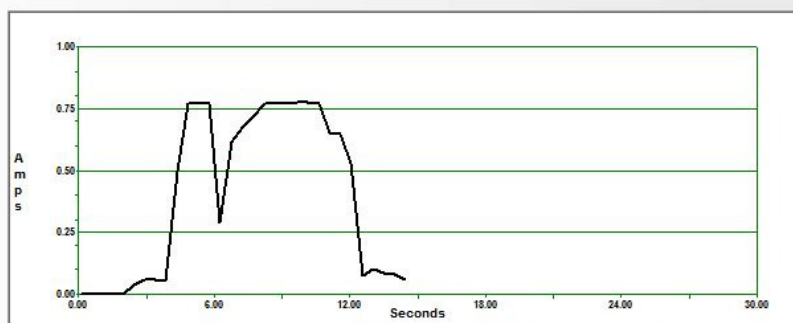
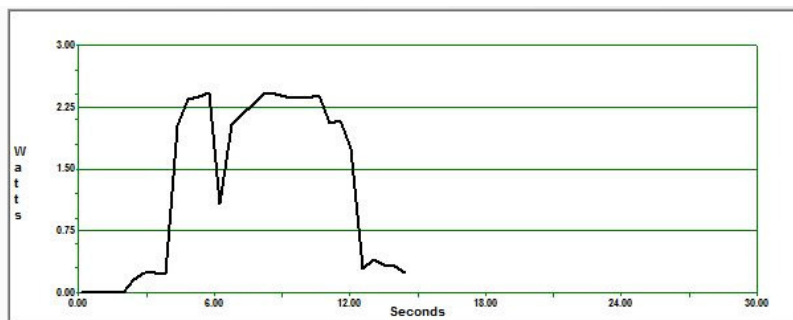
Power or Current will NOT be displayed if you don't have a load switched in with voltage applied. A load can be the ceiling LEDs and fans as well as the SuperCAP car. Otherwise, the Power and Current meters will read zero.



Plotting

To the right of each meter is a graphical plot area that illustrates the real time nature of the Power, Current or Voltage signal being measured. The plots reveal the history of the measured signals and (most importantly) show how Power, Current and Voltage are interrelated.

Power or Current will NOT be displayed if you don't have a load switched in with voltage applied. A load can be the ceiling LEDs and fans as well as the SuperCAP car. Otherwise, the Power and Current plots will read zero.



Screen Capture










At anytime you can click the Screen Capture icon (flash camera) to snap an image of the meters and plots at that instant in time. This is to help you preserve a history of an experiment or test. It

works just like a digital camera, and you can snap as many images as you like – one after the other with no limit!

Each image is stored on the computer's hard disc as a .jpg file under a unique file name. You can access the .jpg images by following this path...

C:\ Users \ \ My Documents \ ecoSTEM House

Each .jpg file has the date (month and day) and time (24 hour format). This gives you an exact date and time as to when the screen was snapped and you can rename these files to anything you want.

 ecoSTEM_House_03-05_at_18-27-20
 ecoSTEM_House_03-07_at_12-46-57
 ecoSTEM_House_03-07_at_12-47-40
 ecoSTEM_House_03-08_at_17-25-11
 ecoSTEM_House_03-09_at_06-57-36
 ecoSTEM_House_03-09_at_09-13-32
 ecoSTEM_House_03-09_at_09-14-13

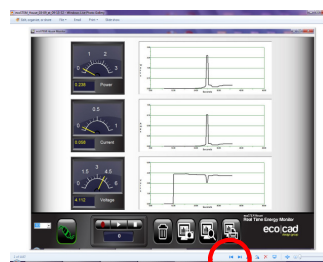
Screen Display

At anytime you can view any of the



Screen Capture images by clicking on the Screen Display icon (magnifying glass). The last captured image will appear in a separate window like

below. You can scroll through the captured images by clicking on the small left-right arrows at the bottom of the plot, and the screen shots will change based on how you snapped your images. Try it!



Screen Print



At anytime you can print the screen by clicking on the Print icon (printer). The image of the screen when this icon is clicked is then output to your printer. This feature is

good to capture instant records of experiments.

Trash



Click the Trash icon to clear the plot area and to erase any previously recorded data.

You can click the Trash icon anytime; just make sure you really want to erase all the recorded data before you do.



Click the Record icon to begin recording. It will turn bright red and the counter will begin to increment at about two counts per second, which is how fast the data is coming from the Control Panel.

Recording and Playback



You can record experiments just like using a digital camera or DVR player. The software has Record (round circle), Play (arrow) and Stop (square) buttons that work much like these familiar devices. There is also a counter under them that indicates where the recording or playback is within the sequence. The counter goes from 0 to 999, which provides for about 500 seconds or 8.33 minutes of recording.

The Recording Group will look like the above image when no data has been recorded. The counter reads 0 and the Record icon is a dim red with the Play and Stop icons white.

Only one recording can take place at any given time. When you click the Record button a new recording is started and the previously recorded data is erased.

Data Playback



You can cancel the recording by either clicking on any of the three buttons. The easiest thing to do is click on the Play button. It will change from White to Green and the data will begin to play back on the meters and the plots. It will continue to loop over and over until you hit another key.

Recording Data

Pause Playback



You can Pause the playback at anytime by clicking on the Play button. It will change from a Green arrow to two vertical bars. The plots and meters will also pause so that you can examine the data in more detail. Clicking the Pause button will resume the Play function.

You can click the Play-Pause button as often as necessary to view the meters and plots in more detail.

By clicking the Stop button the recorded data is still in memory. You can see this by noticing that a non-zero number appears under the buttons. You can replay the recorded data at anytime by pushing the Play button.

Trash



Once again, click the Trash icon to clear the plot area and to erase any previously recorded data.

You can click the Trash icon anytime; just make sure you really want to erase all the recorded data before you do.

Stop



When you click the Stop button it not only stops the Recording, Play or Pause, it puts the software back into real-time display mode. The Stop button will change from White to Green – then go back to White to indicate that the recording or playback has halted.

The Trash icon is probably the most important button. When things look confusing or strange, clicking the Trash icon will generally clear things up.

Excel Interface

In addition to its already powerful real time graphical plotting and data logging capabilities, ecoCAD Real Time Energy Monitoring software comes with the ability to transfer the recorded (logged) data to an Excel[®] spreadsheet.

Here's how it works....

By using the software's Recording and Playback features, each time a new **Record – Stop** or **Record –Play** sequence is performed, an Excel[®] compatible CSV (comma separated variable) file is saved to the hard disk.

The file name begins with the letters ecoSTEM and contains the date and (24 hour) time the recording was begun.

Example:

ecoSTEM_06_02_11_at_13_13_03

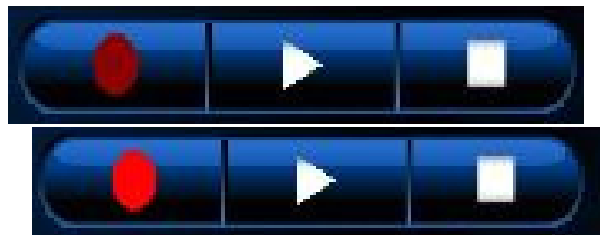
By simply importing this file into your Excel[®] spreadsheet you can do further analysis on the logged data including plotting the variables in any order or style that suits your application.

The CSV files can be found on your hard disk in the same folder as the captured screen .jpg files. Just look under

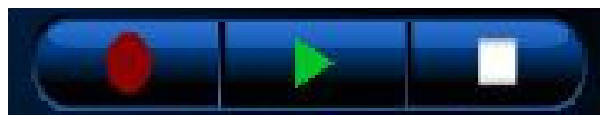
C:/Documents/ecoSTEM House

Example

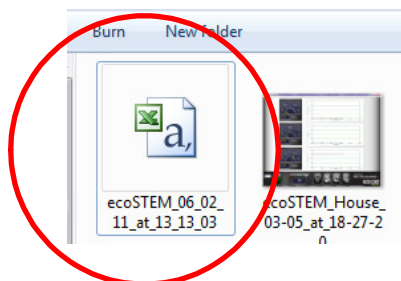
1. To start a Recording, click the red **REC** button. It will change from dull to bright red indicating that data is being recorded.



2. At the same time a new CSV text file is opened and the incoming voltage, current and power data are saved in the file as they are received.
3. To end the recording, click the triangular **Play** or square **Stop** button. The **REC** button will turn dull red again and the **Play** or **Stop** button will turn green. This will also close the CSV text file where it can be imported into Excel[®].



4. To locate the CSV file go to the **C:/Documents/ecoSTEM House** folder where you will find the file mixed in with other previously saved screen capture images. If your folders are set to view files as icons you should see something like this.



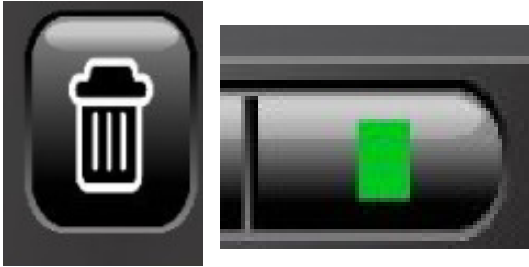
5. To import the file into Excel ® you can
1) simply double-click on it or 2)
launch Excel ® manually, find the
folder and open the file normally. The
data should look something like this
→
6. There are separate columns for Date,
Time, Sample Number, Plot Seconds
(the time from the start of recording
to this sample), voltage (volts), current
(amps) and power (watts).
7. You can then proceed to manipulate
the data in anyway you choose
including generating plots directly
from it.

	A	B	C	D	E	F	G	H
1	Date	Time	Sample	Plot Seco	Voltage	Current	Power	
2	06/02/11	13:13:03	0	0.67	3.781	0	0	
3	06/02/11	13:13:04	1	1.14	3.751	0	0	
4	06/02/11	13:13:04	2	1.64	3.781	0	0	
5	06/02/11	13:13:05	3	2.09	3.781	0	0	
6	06/02/11	13:13:05	4	2.59	3.781	0	0	
7	06/02/11	13:13:06	5	3.08	3.781	0	0	
8	06/02/11	13:13:06	6	3.54	3.751	0	0	
9	06/02/11	13:13:07	7	4.04	3.781	0	0	
10	06/02/11	13:13:07	8	4.54	3.781	0.127	0.48	
11	06/02/11	13:13:08	9	5.03	3.639	0.332	1.208	
12	06/02/11	13:13:08	10	5.51	3.639	0.338	1.23	
13	06/02/11	13:13:09	11	5.99	3.61	0.343	1.238	
14	06/02/11	13:13:09	12	6.45	3.61	0.347	1.253	
15	06/02/11	13:13:10	13	6.94	3.639	0.35	1.274	
16	06/02/11	13:13:10	14	7.43	3.61	0.353	1.274	
17	06/02/11	13:13:11	15	7.88	3.61	0.402	1.451	
18	06/02/11	13:13:11	16	8.38	3.556	0.551	1.959	
19	06/02/11	13:13:12	17	8.86	3.556	0.555	1.974	
20	06/02/11	13:13:12	18	9.36	3.556	0.557	1.981	
21	06/02/11	13:13:13	19	9.83	3.556	0.557	1.981	
22	06/02/11	13:13:13	20	10.31	3.556	0.561	1.995	
23	06/02/11	13:13:14	21	10.8	3.61	0.356	1.285	
24	06/02/11	13:13:14	22	11.28	3.639	0.359	1.306	
25	06/02/11	13:13:15	23	11.73	3.61	0.36	1.3	
26	06/02/11	13:13:15	24	12.23	3.61	0.362	1.307	
27	06/02/11	13:13:16	25	12.7	3.639	0.363	1.321	
28	06/02/11	13:13:16	26	13.18	3.61	0.363	1.31	
29	06/02/11	13:13:17	27	13.7	3.61	0.365	1.318	
30	06/02/11	13:13:17	28	14.17	3.61	0.365	1.318	
31	06/02/11	13:13:17	29	14.64	3.61	0.366	1.321	
32	06/02/11	13:13:18	30	15.13	3.61	0.366	1.321	
33	06/02/11	13:13:18	31	15.59	3.61	0.367	1.325	
34	06/02/11	13:13:19	32	16.07	3.61	0.367	1.325	
35	06/02/11	13:13:19	33	16.55	3.751	0	0	
36	06/02/11	13:13:20	34	17.05	3.751	0	0	
37	06/02/11	13:13:20	35	17.54	3.751	0	0	
38								
39								

More Details

This section gives you more in depth information on important topics of interest (and possible confusion).

The Stop and Trash Icons



The Trash and Stop icons are the most important controls for plotting.

If real time plotting (as opposed to playback) seems to stop or not do what you want it to do, it may be because the Stop icon was not clicked. Make sure to click the Stop icon after each recording to resume real-time plotting.

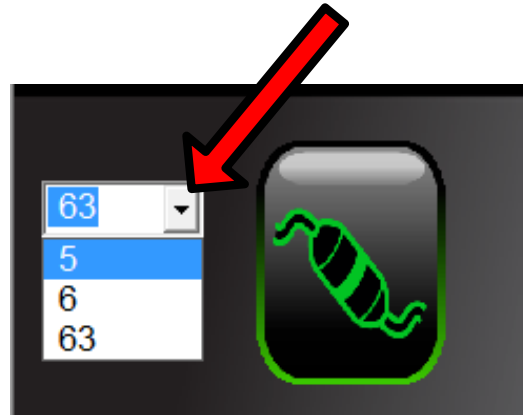
The Trash icon not only erases all the recorded data it also controls the time scale on the plot area. Click the Trash icon to reset the (horizontal) time scale to start at 0.0 minutes again.

When in doubt, click both the Stop and Trash icons to resume normal plotting.

The Connect Icon

Before any plotting can take place the software must connect with the **ecoSTEM House™ Control Panel** that is transmitting

data. Normally the number just below the Connect icon is the right com port number; however, sometime you must select a different number to make the plotting work.



To do so, first select the correct Comm port number.

Click on the arrow next to the number to see if a higher number Comm port is displayed. If so, it's probably the one to use.

When in doubt, find the correct Comm port on your PC by going to **Control Panel -> System -> Hardware Manager -> Device Manager** then click on Comm port. Since you are using a USB connection rather than the traditional RS-232 connection, the Comm port number is not dependent on hardware so much, but rather on settings in the Control Panel of the Windows operating system.

When it's correct, the Connect icon will show that the connection is made. If the Comm port is still not correct an error message will be displayed, which is usually due to the Comm port already in use by another Windows application.